A cabling spool and a method for spooling, coiling and storing of a cable.

Field of the invention

The present invention relates to a general cabling spool as well as a method for using such a cabling spool. General in the sense that it can be used for spooling of electric cables, network cables, or any other type of cable and thread. Parts of or the whole cable can be spooled according to need. In the following the expression "general cable spool" will be replaced by "cable spool".

Background of the invention

A common problem in offices, in rooms for data equipment or telecommunication equipment and in homes, is cables with excess cord, which among other things causes a lot of mess around the equipment. Cables and branch contacts lie haphazardly around and obstruct cleaning, are aesthetically unattractive to look at, and form a security risk. Particularly in the fields of data and telecommunication this will cause reduced service pace and an increased risk of mistakes, as the cables are bundled together in an unsatisfactory manner. More generally, a plurality of cables from one or more appliances in immediate proximity to each other will likely result in tangled cables. It can easily be imagined that in the field of instrumentation, such as medical instrumentation, this may very well be a security risk.

The background for some of these conditions is that there are few or no satisfactory solutions for organising cables and branch contacts.

The most common methods for organising cables, particularly lighter cables, are with different types of disposable strips. This means that as soon as the need arises to move

one or more cables, to wind up one or more cables, or similar, the risk for tangling the cables arises.

A number of ways to solve the above problems are discussed in the patent literature, especially US 6 612 515 B1 (Tinucci et al.). Said document discloses an integrated spool to for spooling cables. However, it has several flaws; the diameter thereof is unnecessarily large, as the wings cannot be folded or in any way contribute to the reduction of the diameter; further, there is no ergonomic or good handle facilitating the manual spooling of the cable. Moreover, there is no satisfactory solution for locking the excessive cable cords to the spool, in order for said excessive cable cords not to move out of the spool.

Further, US 6 554 218 B2 (Buyce et al.) discloses a two-piece cable handling spool which may be joined by way of snap locks, said spool having a number of disadvantages, such as insufficient ventilation, which is negative in cases where cables with currents of a certain magnitude are to be handled. Moreover, the drum housing has a smooth and even surface complicating the handling of the cabling spool, and is hence not very user friendly. The spool may be suited for mounting on a suitable surface, but due to complicated handling it is not suited as a manual spool for simple handling with both hands.

Additional documents known from the patent literature is US 5 915 640, disclosing a dividable cabling spool, as well as the publications DE 4021744 A1, NL 1003472 and NO 301065 B1, in which no satisfactory solution to the previously mentioned problems is presented.

From the above it is apparent that a new and improved spool for manual spooling and handling of cables is desirable.

Brief description of the invention

The present invention eliminates the above mentioned problems in connection with prior art solutions, it combines all the advantageous features of spools known from the patent literature, and additionally it has further uniquely advantageous features, which features will be further described in the independent claims.

There is described a cabling spool for spooling, decoiling and storing of a cable at least consisting of a first spool lid and preferably also a second spool lid and a first and second wing half, in which said wing halves can be joined together and thereby form a cylindrical core with side flanges supporting a spooled cable. Further that the first and alternatively the second spool lid has adaptations adapted to the wing halves so that the first spool lid can be joined together with its corresponding first wing half, the assembled unit forming a first of two halves of a cabling spool, and that a second half of the cabling spool may comprise the second spool lid and the second wing half, or may comprise the second wing half without the second spool lid, the halves of which may be joined together to form a cabling spool.

The present invention further comprises a method for the use of a cabling spool according to the present invention, for spooling, decoiling and storing of a cable on a cabling spool which at least comprises a spool lid and two with halves, in which said wing halves may be joined together and thereby forming a cylindrical core with side flanges supporting a spooled cable, specified in that spooling of a cable is performed for the assembled cabling spool in that one or two spool lids are rotated around two axles constituting a part of the assembled spool lid, and wherein the axles can be rotated around a first axis of rotation, said axles gripping further into axle recesses and that the spool lid or lids are rotated sufficiently to obtain one or

two spool openings which are sufficiently big for the cable to be able to coil up around the cylindrical core of the cabling spool.

Short description of the drawings

The enclosed drawings which are included in and form a part of the specification, illustrate embodiments of the present invention, and together with the specification serve to explain the principles of the invention.

Figure 1 shows a partial front view of an assembly of the cabling spool in a closed position.

Figure 2 shows a partial front view of an assembly of the cabling spool in an open position.

Figure 3 shows a partial front view of the to-piece spool lid 1 in an assembled position.

Figure 4 shows one half of the spool lid 1.

Figure 5 shows a section of a spool lid with snap locks 9, hinging pins/axles 7, as well as support structures 11 for the spool lid 1.

Figure 6 shows a vertical section through the cabling spool in front of the axles 7 over the ridge of the inner ring or the lid ring.

Figure 7 shows half a cabling spool comprising inter alia a spool lid 1 and a spool wing 2.

Figure 7b shows a section through the wing parts 2 the spool lid halves 2 across the locking mechanism.

Figure 8 shows two spool halves kept apart by a spooled cable part locked in the cabling lock 14 with the wing part 2 and the spool lids 1 in a closed position.

Figure 9 shows the two wing parts 2 with the mounted cabling locks 14 assembled without the spool lid.

Figure 10a shows a wing part 2, wherein the flange side of the wing part is perpendicular on, or approximately normally on, an imagined central axis through the central opening of the wing part 2.

Figure 10b shows a detailed section of a cabling lock 14 as an integrated part of a wing part, as well as carvings 15.

Figure 11 shows a slanting front view of the two wing parts 2 of the assembled cabling spool, with a spooled cable without the mounted spool lid 1.

Figure 12 corresponds to Figure 11, however with the wing parts 2 apart.

Figure 13 shows a slanting front view of both wing parts 2 apart, and without a spooled cable.

Detailed description of the invention

In the following each part of the cabling spool, as well as its advantageous features, will be described in closer detail with reference to the enclosed Figures. In the following is a list of the reference numerals used in the enclosed Figures:

1. Two spool lids.
2. Two wing parts, which together form a useable cabling spool without a lid.
3. The core of the cabling spool, i.e. the core around which a spooled cable is coiled,

4. Shows the internal slot diameter of the cabling spool,
5. Recesses in the wing parts 2, for the hinges/axles 7 from the spool lids 1,
6. The diagonal opening of the cabling spool, i.e. the spool opening of the lid when the cabling spool/spool lid 1 is in a closed position,
7. The hinges/axles on the spool lids 1; if the spool lids 1 are joined together a cylindrical well-functioning hinge/axle will be obtained, which upon mounting on the recesses 5 of the wing parts will be able to rotate the spool lids 1 around the axles,
8. Indicates the diameter of the core of the cabling spool and thereby also of the wing parts when they are joined together, i.e. the smallest bending diameter a spooled cable can have,
9. A snap lock to keep the spool lids 1 in a steady position in an open and a closed state,
10. A recess in the spool lids 1 to give a spring function to the side flanges of the spool lids 1,
11. Support structures of the spool lid 1,
12. A static locking mechanism, keeping the lid in a closed position when the cabling spool is split in half for a speedy decoiling, or in a closed state,
13. Ventilation channels to cool the spool,
14. An external cabling lock,
15. S-shaped or approximately S-shaped recesses in the flange sides of the wing parts, in order to facilitate the use of an external cabling lock,
16. A snap lock tongue on each with part for engagement in a pocket in the corresponding wing part when joining the wing halves together.

In the following each part of the cabling spool, as well as its advantageous features will be described in further detail with reference to the enclosed Figures.

The cabling spool according to the present invention is formed as a torus, traditionally with a cylindrical core 3,

with side flanges (Figure 9). A cable may be coiled around said core 3 (Figure 11) and the cable will, with support from said side flanges, assume an orderly and stable adaptation. Said traditional spool part may together with its side flanges be split in to in a preferred embodiment (Figures 11 and 12). Said core part with side flanges, in the following called wing parts 2, have an advantageous shape, not having circular side edges, but each side edge having two curved recesses 15. To simplify the description of the geometrical arrangement of the cabling spool according to the present invention, a three-dimensional orthogonal co-ordinate system, with x-, y- and z-axes, is introduced. The x-axis for said system is placed in the central axle through the cylindrical core 3. The y-axis will be orthogonal to the x-axis and intersect the x-axis in origo and together with the x-axis form the horizontal xy-plane. Further, the z-axis, i.e. the vertical axis, will be perpendicular to said xy-plane and intersect said plane where the x-axis meets the y-axis. The central axis of said cylindrical core 3 is aligned with the x-axis, whereas origo is chosen so that the cabling spool will be symmetric around the yz-plane.

In order to explain the geometrical arrangement of the two wing parts 2, one can imagine starting with the two side flanges of the two wing parts 2, and that they can be seen as approximately disk-shaped circular bodies, or essentially circular bodies, oriented parallel or approximately parallel to the yz-plane, with an opening 4 in the centre of the cylinder.

Continuing with the two side flanges and modifying them in order to make each wing part 2 symmetrical to the xy-plane and putting them together in one piece, the two wing parts 2 will be symmetrical around the z-axis (ref Figures 11, 12, 13) and asymmetrical around the xz-plane, each wing part 2 being provided with two approximately s-shaped recesses 15. To further describe the geometric arrangement

of these two approximately s-shaped recesses 15, reference is most easily made to a first wing part 2 at a time. Starting with a first part of the first wing part 2 which can be described in that all its x-values are larger than or equal to zero, the first recess can be imagined as an approximate s-shaped curve intersecting the imagined circular flange sides in the first quadrant. It can further be imagined that a second approximately s-shaped curve correspondingly intersects the imagined circular flange sides in the quadrant, decided by $x \geq 0$, $y \geq 0$ and $z \leq 0$, thereby forming a second part of the first wing part so that said second part of the first wing part 2 becomes identical to the first part of the first wing part symmetrically placed around the xy-plane. It can be imagined that if the projection of the first wing part against the xy-plane intersects the x-axis in the point (x,0,0) the projection of the identical second wing part intersect the x-axis in the point (-x,0,0). Further, said second wing part will be 180° rotated around the x-axis.

The substantially s-shaped arrangement provides the cabling spool with particularly advantageous functional features which will be further discussed in the paragraph describing the function of the cabling spool. However, it should be noted that said recesses 15 can assume other shapes; alternatively, the wing parts 2 may not include recesses 15.

The flange sides of the wing parts 2 may, according to a first preferred embodiment, be provided with slots/ventilation openings 13, in order to provide the coiled cable with additional cooling, which is particularly advantageous if the cable is used for large currents. In the preferred embodiment the ventilation openings are shaped like oblong openings radially oriented in relation to the x-axis. It should, however, be noted that said ventilation openings 13 may assume other shapes; alternatively, the wing parts 2 may not include ventilation openings 13 at all.

According to the first preferred embodiment each of the wing parts may be provided with an external cabling lock 14. According to the first preferred embodiment said first cabling lock 14 is situated on the external flange side on the wing parts parallel with the y-axis. Said cabling lock 14 will secure that the cable is held firmly to the side flanges of the wing parts 2, the cabling lock 14 being arranged such that it can clamp a cable to the external side edges of the side flanges of the wing parts 2. The cabling lock can be made of the same material as the rest of the cabling spool; other advantageous materials may alternatively be chosen to obtain sufficient strength to keep the cable clamped to the external sides of the wing parts 2. Said cabling lock 14 is not necessarily a condition for the cabling spool to have a favourable function. Consequently, the cabling spool may have a cabling lock 14 of a different design; alternatively, not have one or more cabling locks 14.

For connecting the two wing parts 2 the wing parts according to a first preferred embodiment may be provided with one or more snap lock tongs 16, such that the two wing parts 2 can be clamped together and assume a locked position, the snap lock 16 is attached to a recess in the adjoining wing part 2. Preferably, the snap lock 16 will protrude from the circumference of the central opening 4 of one or both of the wing parts 2 parallel with the x-axis, and with a curve corresponding to the radii of curvature of the internal central opening 4 towards the cylindrical core. The arrangement itself of the snap lock 15 may vary. Likewise, the choice of material may be the same as the rest of the cabling spool, or an alternatively suitable material may be used. The important thing is that to maintain some of the advantageous functional features of the cabling spool, it must be easy to assemble and disassemble the wing parts 2..

The cabling spool according to the first preferred embodiment comprises the wing parts 2 as well as two external spool lids 1. Said spool lids 1 is hinged to the wing parts 2 by means of two axle pins 7 on the spool lids 1, the axle pins 7 being shaped such that each spool lid 1 forms two half axle pins 7. Said axle pins 7, when the spool lids are closed, are shaped like cylinders, the central axis thereof being parallel with the z-axis. Each wing half 2 has in its internal circumference, parallel with the z-axis, two recesses 5 adapted to the axle pins 7 of the spool lids 1, such that the spool lids may be pivoted around said axle.

The two wing halves 2 further have recesses adapted such that the spool lids 1 can be placed in two locked positions, open and closed, said recesses being adapted to two raised parts 9 in the spool lid, such creating a snap lock arrangement.

When spooling a cable, the cable will bed coiled around the cylindrical core 3 of the wing parts.

In order to maintain all the advantageous functional features of the cabling spool, the above mentioned spool lid 1 constitutes a part of the complete cabling spool. Consequently, a description of a first preferred embodiment of said spool lids 1 will follow.

The spool lids 1 preferably consist of two identical halves (Figures 3, 4 and 5), each half being adapted to be joined together with an opposite half. If one imagines the two spool lid halves 1 assembled together without being attached to the wing parts 2, in such a way that the axle pin 7 of each spool lid 1 fits together, such that the two axle pin parts 7 together form a cylindrical axle 7, then the spool lids 1 will be symmetrical around the z-axis, symmetrical around the xy-plane, and asymmetrical around the yz-plane. Assembled together in such a position as shown in Figure 3 the spool lids 1 will have an opening 4

like a central whole for a cylindrical core. The external diameter of said core will be adapted to the internal diameter of the cylindrical core of the wing parts 2, such that the assembled spool lid 1 may move freely or approximately freely around its axle pins 7 attached to the recesses 5 in the wing halves 2.

Out from the cylindrical core the spool lids have a sector of a curved side flange which is oriented around the x-axis. Said curved side flanges will completely or partially envelop the side flanges of the wing halves 2, where said side flanges have maintained a circular or approximately circular shape, such that a closed locked position will keep the cable from slipping out of its groove 3 in the cabling spool.

In a first preferred embodiment the spool lids have a locking mechanism 12 which, when the cabling spool is open, but simultaneously each wing part 2 being attached to its corresponding spool lid 1, makes sure that the spool lid remains in a closed position when the spool is split (Figures 7a and 8). Said locking mechanism 12 may be provided as a pin on the spool lid 1 on the y-axis, where the tap is oriented parallel with the z-axis and further on the inside of the curved wing of the spool lid and along the rim or the corresponding circular outer rim of the wing part 2, when the cabling spool is in its closed position. The pin 12 protrudes enough to hold the spool lid 1 in a locked position in relation to the side flanges of a wing part 2 (Figure 7a). Further, said locking mechanism 12 gives the user an imagined locking feeling, when the spool is closed.

In a first preferred embodiment the curved side flanges on the spool lids 1 have ventilation openings 13 to allow access of sufficient air cooling to the cable coiled on the cabling spool. The ventilation opening may assume multiple shapes, but is according to the first preferred embodiment shaped like oblong openings radially oriented in relation

to the x-axis, in the same way as for the wing parts 2. In this way the ventilation openings 13 for the spool lid 1 and wing part 2 overlap. Said ventilation openings 13 are not of vital importance to secure the advantageous function of the cabling spool, and hence the spool lids 1 may optionally comprise ventilation openings 13.

Assembly of the complete cabling spool comprising both the wing parts 2 and the spool lid 1, will in the following be explained with support in Figures 7 and 8. Imagining a lid 1 oriented with the central axis of its core aligned with the x-axis, and correspondingly seeing a wing part 2 oriented with its cylindrical central axis aligned with the same axis, simultaneously keeping the two parts 1, 2 at a distance from each other, joining said parts 1, 2 together will achieve a snap lock function due to the pin 9, and simultaneously achieve a lock due to the pin 12 gripping into the external circumference of the circular part of a side flange on a wing half 2. The pin 9 is gripping into a corresponding recess in the wing part 2. Further, the half axle pin 7 fits into a corresponding recess 5 in the assembled wing part 2. Following said directions one will achieve one half of the complete cabling spool. Consequently, repeating the operation will achieve two halves of a complete cabling spool. Said two halves can thus be joined together such that the lock tongues 16 fits into a corresponding recess for the opposite cabling spool half (Figures 1, 7 and 8).

A variant of the cabling spool may be produced with two wing halves 2 and only one spool lid 1 with a modified complete axle pin 7 and central ring, the main function of the lid, i.e. cabling lock and handle, still being maintained and the cabling spool according to the present invention still maintaining its advantageous features.

The two wing halves 2 can also be joined together without the spool lid, as per Figures 9 and 13, correspondingly

described for the wing halves 2 and the spool lid 1 in combination. A more traditional spool without a lid will thus be achieved, but will according to a first preferred embodiment achieve two cabling locks 14.

The individual parts of the complete cabling spool are according to the above made up of four components, two spool lids 1 and to wing parts 2. There is nothing preventing the lid 1 from comprising one or several components, and the same goes for the wing part 2. However, it is important to maintain the desired function of the cabling spool, particularly that the spool lids 1 are shaped such that they can be pivoted around the vertical z-axis when the spool lids are joined together with the wing halves 2, and assembled as a complete cabling spool. Further, it will necessarily be an advantage if the complete cabling spool is arranged with side flanges, such that any coiled up cable is not going to slip out of the cylindrical core 3 of the cabling spool. Still further, it will be an advantage if the flanges of the spool lid 1 are curved as described above, and thus envelop a coiled up cable in the cabling spool housing when the cabling spool is in a closed position.

<u>The function of the cabling spool according to a first preferred embodiment</u>

Based on the Figures, especially Figures 1, 2 and 8, it is seen that the cabling spool comprises several functional features which combined achieve the desired function; in the following a description of function of the cabling spool will be given. There will be given an explanation of cable spooling, thereafter locking of the cable and closing of the cabling spool, and subsequently will be given an example of the decoiling of a cable according to two methods.

As mentioned, the cabling spool comprises a two-piece lid 1,1 and an integrated spool part 2, as well as the two wing halves 2. The spool part 2 can be considered as the inner half of a torus 8, with an internal diameter defined by the opening 4. Preferably, but not necessarily, the internal diameter can even be adjusted to secure a minimum radii of bending for the cable and a good handle for the user.

To coil up the cable the cabling spool must be opened, i.e. the spool lids 1 are pivoted around their axles 7 such that the central axis for the central cylindrical part of the spool lid preferably will measure approximately 45° with the y-axis. In such a position the cylindrical core of the cabling spool will be accessible for spooling of the cable, thus having an opening 6 owing to the fact that the curved wing parts of the spool lid 1 have been placed in an open position which does not close the cable in. Hence, the cable can be spooled on the cylinder surface 3. This can for example be done by holding on to one of the side flanges of the spool lid 1 with one hand, whereas the other hand is free to spool the desired quantity of cable. The shape and orientation of the spool lid 1 form a particularly favourable ergonomical handle when spooling a cable. According to a first preferred embodiment it is possible to lock the cable in the cabling lock 14 as soon as the spooling has been completed. Said cabling lock 14 is easily accessible as there is the recess 15 facilitating the access to the cabling lock 14, the side edge of the recess 15 also being faced (see particularly Figures 9, 10b and 11) in order to further facilitate the attachment of the cable to its cabling lock 14.

In its open position the cabling spool will be locked owing to the fact that there is a "two state positioning mechanism" (Figure 5) working such that the inner ring of the spool lids 1, which together form a cylindrical shape, the inner ring or lid ring with hinges 7 are elevated with their side flanges, whereby is found a recess 10 against

the inner ring/lid ring of the spool lid 1. In its open and closed positions the cabling spool will be free of strain from the lid ring, but the ridges/side flanges of the lid ring function as lateral stabilization. This entails that the lid is stable in an open or closed position. If the spool lid 1 is opened, the lid ring with ridge/side flange will stop against the stabilization ridges. However, the spool lid 1 is constructed to yield to excessive pressure on the ridges in that the spool lid 1 has a recess 10 entailing that the support structures 11 in the spool lid 1 together with the lid ring form a spring mechanism. Thereby the lid may be moved with force between its closed and open state.

The above disclosure of the locking mechanisms for the open and closed state may also be described with reference to Figure 7b illustrating the static locking mechanism made possible by the pin 12 in a different way. The Figure shows a section through the cabling spool and the spool lid 1 across the locking mechanism. 2A in Figure 7b shows the section of the two wing halves 2 in a assembled position, whereas 1A in the same Figure shows the section of the spool lid 1 with the lock 12A, 12. When the lid is opened it will move in the direction of the bold arrow and the lock 12A will abut on the two wing halves 2 in an assembled position 2A. With more force the obstacle which the lock/pin 12A, 12 represents will be overcome and the lid may be opened.

After spooling the desired quantity of cable the spool lids 1 may be closed to cover the spooled cable as described above. Closing is simply done by pivoting the spool lids 1 in the opposite direction of the opening of the spool lid.

Decoiling of cable is done by opening the spool lid 1 to the same position as when spooling the cable. Further, the side flanges of the spool lid may advantageously be used as handles, thereby loosening the cable from its cabling locks

14 if present, and used. Finally, the cable is decoiled through the opening 6 of the cabling spool.

An especially fast decoiling of the cable may be achieved by splitting the cabling spool in two halves (see Figure 8). The spool lid 1 of the cabling spool will stay assembled together with the wing halves 2 owing to the pin 12 on the spool lid 1. The cable may then be loosened from its respective cabling locks 14 if the cabling spool is provided with them. A fast and free decoiling may now be achieved.

Referring to Figure 6 the opening and closing mechanisms of the cabling spool, or "two state positioning mechanism", are illustrated in a different way. It shows a vertical section through the cabling spool right in front of the hinges above the ridges/side flanges on the lid ring. The Figure also shows the profile of a cabling spool arranged in a stable way between the two spool lid halves 1 on Figure 6 with reference numerals 1A and 9A. As the lid ring has been constructed to yield, the spool lid 1 will open under pressure. This will also be the case when closing the lid.

In the above discussion the individual elements of the spool as detached elements are disclosed, in order to simplify the understanding of the invention, and must consequently not necessarily be considered as physically separate parts. As mentioned above due to manufacturing processes or material characteristics considerations may indicate that the cabling spool is made up of several parts produced in multiple materials, which are then joined together to give the cabling spool its desired function according to the present invention. It should be particularly noted that different material requirements may be made for the execution of the different features of the invention. Typically, the optional cabling lock 14 may be made in a material with particularly favourable qualities

with regard to the desired "spring effect" or "clamping effect". The material used in said cabling lock 14 may further have qualities preventing fatigue fracture by repeated use. The choice of material and the production process will eventually be decided by the desired characteristics, the desired price as well as the desired production quantum. In the above the expression "integrated" means that the first and second part indicated as integrated is only in a material sense for the completely assembled cabling spool 1.